

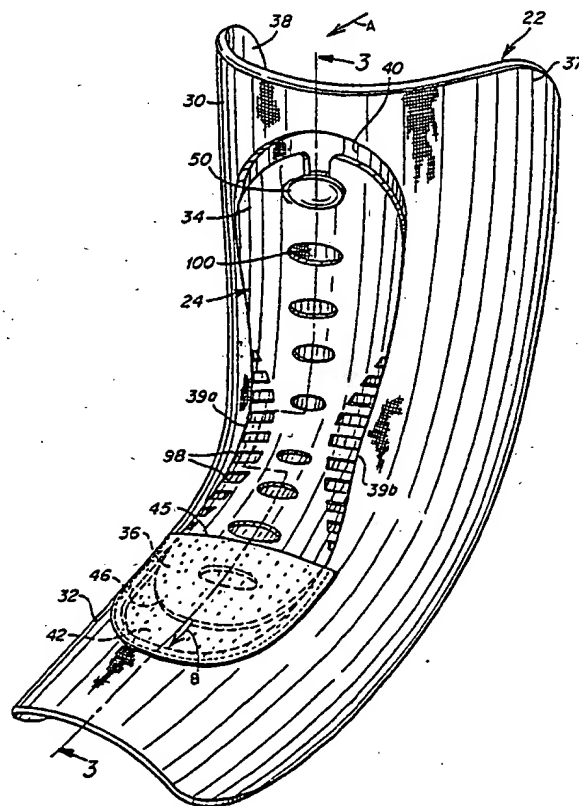
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification ⁷ : A43B 5/04, 23/26</p>	<p>A1</p>	<p>(11) International Publication Number: WO 00/33692 (43) International Publication Date: 15 June 2000 (15.06.00)</p>
<p>(21) International Application Number: PCT/US99/29141 (22) International Filing Date: 7 December 1999 (07.12.99) (30) Priority Data: 60/111,309 7 December 1998 (07.12.98) US (71) Applicant (for all designated States except US): THE BURTON CORPORATION [US/US]; 80 Industrial Parkway, Burlington, VT 05401 (US). (72) Inventors; and (75) Inventors/Applicants (for US only): DACHGRUBER, Suzanne [US/US]; 20161 Windrow Drive, Lake Forest, CA 92630 (US). BAILEY, Catherine [US/US]; 247 4th Street #105, Oakland, CA 94607 (US). TAN, Joseph [US/US]; 247 4th Street #105, Oakland, CA 94607 (US). (74) Agents: HONEYMAN, Jason, M. et al.; Wolf, Greenfield & Sacks, P.C., 600 Atlantic Avenue, Boston, MA 02210 (US).</p>		<p>(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP (Utility model), KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).</p> <p>Published With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</p>

(54) Title: TONGUE STIFFENER FOR FOOTWEAR

(57) Abstract

A tongue construction for footwear is configured with a tongue and a stiffener (24) that is able to move relative to the tongue, thereby resisting pinching of the rider's foot as the boot is flexed. As a result, footwear having desired stiffness while substantially reducing discomfort, especially during flexing of the footwear is provided. By allowing the stiffener to slide rather than bend, or at least to reduce the extent of bending of the stiffener, pinching of the dorsal area near the ankle may be minimized as may be digging of the stiffener into the dorsal area near the toe. Consequently, a soft or hybrid snowboard boot is provided that provides both enhanced power transmission as well as improved wearer comfort.



FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

TONGUE STIFFENER FOR FOOTWEAR

Cross-Reference to Related Applications

This application claims the benefit of U.S. Provisional Patent Application No.
5 60/111,309, filed December 7, 1998, which is herein incorporated by reference in its entirety.

Background of the Invention

Field of the Invention

The invention relates to footwear, and more particularly to a tongue stiffener for
10 footwear.

Related Art

Snowboard boots provide a rider with a selected combination of flexibility and support for comfort and board response. Snowboard boots also provide the rider with good
15 "feel" or feedback from the board as it traverses terrain to allow for improved board control in a variety of conditions.

Board control may be affected by the stiffness of the boot. With increased stiffness, such as provided with hard boots, comes increased force transmission and greater board control. However, hard boots may be uncomfortable, especially while walking. On the other
20 hand, flexible boots (soft and hybrid boots) may be less responsive to rider induced forces but are more comfortable. Hybrid boots include features of both soft and hard boots. In this respect, hybrid boots may include a rigid or semi-rigid sole and an upper portion divided into a rigid or semi-rigid lower portion and a flexible top portion.

Boots are known which attempt to balance the comfort of a soft or hybrid boot with
25 the force transmission of a hard boot. These soft or hybrid boots may include a tongue configured with a rigid member or stiffener for imparting stiffness and resulting power transmission particularly on toe-side turns. Such tongue constructions, however, may create pressure points on a user's foot or leg when the boot is flexed. In this respect, as a rider leans against the top portion of the boot tongue during a toe-side maneuver, the stiffener may bend
30 at the mid-section, which may pinch the dorsal area of the rider's foot near the ankle. In

addition, flexing of the tongue may cause the front end of the tongue stiffener to dig into the dorsal area of the rider's foot near the toe.

Summary of the Invention

5 The present invention is directed to a tongue stiffener and to a tongue including a tongue stiffener (hereinafter referred to as tongue constructions) that provide enhanced footwear stiffness. The tongue stiffener may be adapted to conform to the shape of the footwear tongue and is configured for movement relative to the tongue as the footwear is flexed forwardly. By allowing the stiffener to move in a controlled manner pinching of the
10 dorsal area near the ankle may be minimized as may be digging of the stiffener into the dorsal area near the toe or shin. Pinching by the stiffener may further be controlled by forming flex inducing members along at least a portion of the sides of the stiffener. Consequently, footwear including the inventive tongue stiffener arrangement provides both repeatable enhanced power transmission as well as improved wearer comfort. In addition, the stiffener
15 may include apertures for receiving stiffness adjusters for varying the flexibility of the stiffener.

 In one illustrative embodiment of the invention, a tongue construction for an article of footwear includes a tongue and a tongue stiffener. The tongue stiffener includes an elongated body having a first portion engaged to the tongue and a second portion movable relative to
20 the tongue as the tongue is flexed forwardly. Movement of the second portion thereby reduces pressing of the stiffener into the tongue.

 Various embodiments of the present invention provide certain advantages. Not all embodiments of the invention share the same advantages and those that do may not share them under all circumstances. This being said, the present invention provides numerous
25 advantages including the noted advantage of providing repeatable increased stiffness to a soft or hybrid boot while reducing discomfort during flexing of the boot.

 Further features and advantages of the present invention, as well as the structure and operation of various embodiments of the present invention are described in detail below with reference to the accompanying drawings.

Brief Description of the Drawings

The invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is an exploded perspective view of a boot including a tongue construction
5 configured with a tongue and a tongue stiffener according to one aspect of the present invention;

Figure 2 is an assembled perspective view of the tongue construction of Figure 1;

Figure 3 is a cross-sectional view of the tongue construction taken along line 2-2 of
Figure 2;

10 Figure 4 is an exploded perspective view of a portion of the tongue construction showing attachment of the tongue stiffener to the tongue;

Figure 5 is an assembled cross-sectional view of the tongue construction of Figure 4 taken along line 5-5 of Figure 4;

Figure 6 is a cross-sectional view of an alternative tongue construction of Figure 5;
15 and

Figure 7 is a perspective view of an alternative tongue construction.

Detailed Description

Figures 1-3 show a tongue stiffener 24 according to one illustrative embodiment of
20 the invention. The tongue stiffener 24 is constructed and arranged to cooperate with a tongue 22 of an article of footwear, such as a boot 20. The stiffener is engaged with the tongue in a manner to allow movement relative to the tongue 22, at least along a shin-to-toe direction. In one embodiment, the stiffener 24 is attached to the shin portion of the tongue 22 (hereafter referred to as the upper end 30) but includes a limited region of unconstrained movement at
25 the toe region of the tongue 22 (hereafter referred to as the lower end 32). Thus, an upper end 34 of the stiffener 24 is attached to an upper end 30 of the tongue 22 and a lower end 36 of the stiffener 24 is not attached to the lower end 32 of the tongue 22. Therefore, as the boot is flexed in a direction shown as arrow A in Figures 2 and 3, the lower end 36 of the stiffener 24 is free to move, such as by sliding, in a direction shown by arrow B, relative to and over, or
30 along the surface of, the tongue 22. Movement of the stiffener 24 as the tongue 22 (or boot)

is flexed reduces the likelihood of discomfort to the rider; in this respect, pinching of the dorsal area of the rider's foot near the ankle by the mid-section of the stiffener as well as digging into the dorsal area near the rider's toe by the leading end of the stiffener may be minimized. Although the stiffener 24 moves relative to the tongue 22, it nevertheless
5 cooperates with the tongue 22 to provide a stiffer tongue construction through which to transmit rider induced forces particularly on toe side turns as compared to the same tongue but having no stiffener.

Flexing in the medial or lateral direction also may be provided by allowing the stiffener 24 to move in a sideways, or partially sideways direction, relative to the tongue 22.
10 In this respect, as the rider rolls his foot outwardly (laterally) or inwardly (medially), the stiffener 24 may shift over the tongue 22. If the stiffener 24 was otherwise constrained, the stiffened tongue 22 would resist medial or lateral flexing, thereby potentially limiting the performance and comfort of the boot.

In the embodiments described herein, the tongue stiffener overlies an outward facing
15 surface 37 of the tongue 22. However, it is to be appreciated that the present invention is not limited in this respect and that other suitable locations may be utilized. For example, the tongue stiffener 24 may be mounted within the tongue or may underlie the tongue 22 on an inward facing surface 38 of the tongue 22.

The stiffener 24 may be permanently or removably attached to the tongue 22. In one
20 illustrative embodiment, as shown in Figures 1-3, a hook 50, which may be attached to the upper end 30 of the tongue 22, may be used. The stiffener 24 may include a slot 52 which is adapted to engage with the hook 50. As best shown in Figures 4 and 5, the tongue 22 may be formed with an opening 53 at the upper end 30 thereof to receive the hook 50 therein. Of course, the present invention is not limited in this respect and the hook 50 may be attached to
25 the tongue 22 by any suitable arrangement. Other suitable attachment techniques may be employed, such as screws, rivets, hook and loop fasteners, stitches, pockets, straps, adhesives, clamps, etc. A pocket may be formed either within the tongue body itself or by simply stitching a cover over the surface of the tongue. The tongue stiffener may also be configured with grooves that fit into corresponding guides in the tongue. The tongue stiffener may be
30 fixed to the tongue to provide a controlled movement of the stiffener in a shin-to-toe direction relative to the tongue upon flexing. In this respect, each time the tongue is flexed, the tongue

stiffener may be able to return to its original position. Thus, whenever subsequent flexing occurs, a similar performance of the boot may be provided.

Although the stiffener 24 is shown as fixed at the upper end 30 of the tongue 22, it is to be appreciated that the present invention is not limited in this respect and that other
5 suitable fixing locations may be provided so long as at least a portion of the stiffener 24 is capable of moving relative to the tongue 22 as the tongue or footwear is flexed. For example, the stiffener 24 may be fixed at an intermediate point, such as along one or both sides, with free upper and lower ends. Alternatively, the stiffener 24 may be fixed at the lower end with a free upper end. Other suitable locations or combination of locations will be apparent to one
10 of skill in the art. It is to be appreciated, however, that fixing a portion of the tongue stiffener at a particular location should allow the other portions of the tongue stiffener to move relative to the tongue so as to prevent pressing of the tongue stiffener against any portion of the wearer's foot and/or leg.

Continuing with reference to Figures 2 and 3, the tongue stiffener 24 may be shorter
15 than the tongue. In this respect, the lower end of the tongue stiffener is spaced from the lower edge of the tongue and the upper end of the tongue stiffener is spaced from the upper edge of the tongue. In one embodiment the tongue 22 may be formed with a recess 40 configured to receive the tongue stiffener 24. The recess 40 may be longer than the tongue stiffener 24, thereby defining an open area 42 between the lower end 36 of the stiffener 24 and a lower
20 edge 44 of the recess 40. The open area 42 provides a path for the tongue stiffener 24 to move in the recess 40 upon flexing of the boot. The open area 42 should be long enough to allow the stiffener to slide through a predetermined angle of flex of the footwear. For example, the recess 40 may be configured to allow the footwear to be flexed up to an angle of 45° from its rest position, without the end of the stiffener abutting the end of the recess. In
25 one embodiment, the recess 40 is about 2 cm longer than the tongue stiffener 22, although more or less distance may be provided. Although the recess 40 is longer than the tongue stiffener 24, it should be appreciated that the present invention is not limited in this respect and that the recess 40 may be made substantially the same size as the tongue stiffener 24, where the tongue stiffener 24 is not intended to move appreciably relative to the tongue 22.

30 In the embodiments where the bottom end of the tongue stiffener is fixed to the bottom end of the tongue, an open area may be formed at the top of the recess in which the

tongue stiffener may move when the boot is flexed forwardly. The extent to which the tongue stiffener moves may be limited so as not to press into the rider's leg. The length of the stiffener may be less than the length of the tongue to ensure that, upon flexing, the tongue stiffener does not extend beyond the upper end of the tongue.

5 Similarly, in embodiments where the tongue stiffener is fixed at an intermediate location, the recess may be configured to provide an open area at an upper end, at a lower end or at both the upper and lower ends. Also, if no recess is provided, the ends of the stiffener should be spaced from the corresponding ends of the tongue.

The recess 40 formed in the tongue 22 may also allow the tongue 22 and tongue
10 stiffener 24 to form a slender profile. In one embodiment, the recess has a depth about equal to the thickness of the tongue stiffener such that presence of the stiffener 24 does not create a pressure point against the wearer's foot or leg. For example, the boot may be configured with closure devices, such as laces, straps, cables, cords, and other devices recognized by those of skill in the art, that extend across the tongue of the boot. Tightening of the closure devices
15 may cause a downward force on the tongue that can be distributed over both the surface of the tongue as well as the stiffener, rather than just over the stiffener, because, in this embodiment, the stiffener does not protrude beyond the profile of the tongue. Rather, the stiffener is disposed within the recess. If the stiffener was to protrude beyond the surface of the tongue, (i.e., not received within the recess), then the force of the closure devices would act only on
20 the stiffener, potentially causing an uncomfortable pressure point. It should be appreciated that such a downward force on the tongue and stiffener may not only arise from tightening a wearer's foot within the boot, but also may arise when securing the boot to a strap binding for a snowboard where the strap extends across the front of the boot, as is the case with convention tray bindings for snowboards.

25 Of course, it should be appreciated that the present invention is not limited in this respect and that a recess need not be provided or may be deeper or shallower, as desired, with a desirable, although not required, corresponding change in the thickness of the tongue stiffener.

To aid in maintaining the stiffener 24 adjacent the tongue 22 while allowing for
30 relative movement between the two, a cover 45 may be stitched or otherwise joined to the tongue 22. The cover 45 may also function to loosely constrain or to limit shin-to-toe

movement and medial and/or lateral movement of the stiffener 24. The cover 45 may be formed of leather or a synthetic fabric or other suitable material that is durable yet sufficiently resilient to allow controlled flexing or movement of the stiffener 24. Although a cover 45 is illustrated, other arrangements for maintaining the tongue stiffener 24 adjacent the tongue 22 may be utilized. The cover may also loosely constrain shin-to-toe movement while restricting medial and/or lateral movement of the stiffener 24. Alternatively, the cover may restrict movement of the tongue stiffener in the shin-to-toe direction but may loosely constrain medial and/or lateral movement of the stiffener. In addition, such an arrangement may be configured to loosely hold the tongue stiffener adjacent the tongue such that limited movement of the tongue stiffener away from the surface of the tongue may be provided.

One such arrangement includes harnessing the stiffener 24 with a band extending across at least the lower end 36 of the stiffener 24 or with the laces of the boot as the laces are tightened. The width of the band may be sufficient to extend a substantial portion of the length of the stiffener. Another such arrangement includes providing the tongue 22 and stiffener 24 with a post and mating slot to receive the post. The post is able to slide within the slot to allow relative movement of the stiffener and the tongue. Another arrangement includes forming a pocket in the tongue 22 so that at least the lower end 36 of the stiffener 24 may be held therewithin. Other suitable arrangements will be apparent to one of skill in the art. In addition, it is to be appreciated that no such arrangement is necessary for the stiffener 22 to function according to the invention.

Referring now in particular to Figure 3, which is a cross-sectional view of the tongue 22 taken along line 3-3 of Figure 2, in one illustrative embodiment, the lower end 36 of the stiffener 24 may be formed with a tip 46 having a tapered, stepped or other suitably narrowing dimensioned cross-section. In one embodiment, the tip narrows from a thickness of about 2 mm to a thickness of about 1 mm. This narrowing dimensioned tip 46 facilitates movement of the stiffener 24 relative to the tongue 22, thereby allowing the stiffener 24 to easily glide over the tongue 22 and reducing the likelihood of the stiffener 24 catching on the surface of the tongue 22. In addition, the width of the lower end of the tongue stiffener may taper toward the tip. Such tapering may be suitable to further facilitate movement of the stiffener relative to the tongue. This tapering may also facilitate insertion of the stiffener beneath the cover or into another suitably configured arrangement to hold the lower end of

the stiffener adjacent the tongue. Further, the surfaces of the stiffener may be lightly textured so as to permit ease of movement relative to the tongue and other components of the footwear.

Continuing with the illustrative embodiment of Figures 4 and 5, the hook 50 may include a base 54, having an inwardly facing side 55, and an insert 56. The insert 56 may include an annular region 58 that snap fits into the opening 52 of the stiffener 24 to hold the stiffener relative to the tongue 22 at the upper end 30 thereof. The base 54 of the hook 50 may be received in a depression 60 formed on the inwardly facing surface 38 of the tongue 22 so that the hook 50 does not protrude into the area of the boot occupied by the wearer's shin. In this respect, the hook 50 does not interfere with the comfort of the tongue 22 against the wearer's shin. To enhance the comfort, a foam covering 61 may be glued or otherwise attached over the inwardly facing side 55 of the base 54. However, it should be appreciated that the present invention is not limited in this respect and that neither the depression 60 nor the covering 61 is required.

The base 54 of the hook 50 may include a bore 62 to receive the insert 56 and may be attached to the insert 56 with the use of a rivet 70, or any other suitable fastener. An axially extending groove or ridge 74 may be formed on the insert 56 to engage with a corresponding mating feature 75 on the base 54 to reduce the possibility of relative rotation. It is to be appreciated, however, that other suitable anti-rotation features may be used. The hook 50 may also be used to receive the laces of the boot to maintain the tongue 22 in a relatively central position with respect to the boot.

In an alternative embodiment, as shown in Figure 6, the insert 56 may have an annular ring 78 to snap fit into a corresponding groove 80 formed in the base 54, thereby obviating the need for the rivet or other fastener. Although not shown, this embodiment may also include a suitable anti-rotation feature to reduce the possibility of rotation of the hook 50.

As described above, the present invention is not limited to any particular attachment mechanism to secure the stiffener 24 to the tongue 22 and other suitable arrangements may be used. In this respect, referring in particular to Figure 7, an alternative embodiment for attaching the stiffener 24 to the tongue 22 is shown. In this illustrative embodiment, the upper end 34 of the stiffener 24 may include one or more eyelets 90 for receiving the lace of the boot. The tongue 22 may also be formed with one or more corresponding eyelets 92.

Thus, the lace may be used to secure the upper end 34 of the stiffener 24 to the tongue 22, while centering the tongue 22 relative to the boot.

The tongue stiffener 24 as shown in Figure 1, may be conformable to approximate the contour of the tongue or be sufficiently flexible to conform to the surface of the tongue as the tongue stiffener is drawn to the surface of the tongue by, for example, the closure device of the boot or the straps of the binding. In this embodiment, the stiffener body includes a medial side 39a and a lateral side 39b, each extending between the upper end 34 and the lower ends 36. The stiffener body may be formed with a concave top surface in a direction that extends from the upper end 34 to the lower end 36 and may also include a convex top surface in a direction that extends from the medial side 39a to the lateral side 39b. The surface of the stiffener that conforms to the contour of the tongue preferably includes a smooth surface having limited projections extending therefrom which would otherwise interfere with the surface of the tongue upon sliding of the stiffener relative to the tongue. In addition, the surface that approximates the shape of the tongue also includes a complementary shaped surface to that of the top surface. Namely, the bottom surface is convex in a direction that extends from the upper end 34 to the lower end 36 and includes a concave surface in a direction that extends from the medial side 39a to the lateral side 39b.

The sides 39a, 39b may taper toward each other at the mid-section of the stiffener such that the resulting shape resembles an hour-glass. This reduced width at the mid-section also allows a change in the stiffness of certain portions of the stiffener relative to other portions. In this respect, the stiffener may easily bend about the mid-section. The tapered sides, and resulting hour-glass shape, also limits the amount of material at the mid-section so that, as the tongue is flexed forward, the sides may remain substantially in contact with the tongue surface, thereby minimizing bulging of the stiffener. However, the present invention is not limited in this respect and that other suitable methods for causing the sides to remain in contact with the tongue may be employed. In this regard, the stiffener may be formed with straight sides, each having a laterally extending slit formed therein at generally the mid-section of the stiffener. Thus, as the tongue and stiffener is flexed forward, the sidewalls separate at the slit, thereby causing the sides to substantially remain in contact with the tongue surface and minimizing bulging of the stiffener. In another example, the sides of the

stiffener may be formed with a relatively elastic material so as to conform to the resulting shape of the flexed tongue.

In one illustrative embodiment, the width of the tongue stiffener is less than the width of the tongue and also may be less than about the distance between eye stays 120a and 120b (see Figure 1) of a boot when in the secured position. In one embodiment, the width of the tongue stiffener is preferably less than 3 inches, more preferably less than 2.5 inches, and even more preferably less than about 2.25 inches. The width of the tongue may be about 7 inches. The length of the tongue stiffener may be less than about 7 inches, and more preferably less than about 6 inches, and the length of the tongue may be about 10 inches.

In some instances, it may be desirable to control the flexibility of the tongue 22 and subsequently the boot and this flexibility may be controlled in a number of ways. The stiffener 24 may be removable from the tongue 22 allowing the rider to choose between a more stiff boot (with the stiffener 24 attached) and a more flexible boot (with the stiffener 24 removed). The boot may also be provided with interchangeable stiffeners 24, each having a different flexibility. Thus, the wearer may select from a variety of stiffeners to alter the properties of the boot. The flexibility or rigidity of the stiffeners 24 themselves may be varied in any of a number of ways; for example, by forming the stiffeners with different materials or by forming the stiffeners with different shapes or dimensions. In one illustrative embodiment, a stiffener 24 may be formed of a semi-rigid material such as thermal plastic polyester elastomer so that it is stiffer than the tongue. In one embodiment, the tongue stiffener may have a durometer of about 74 Shore D and the tongue may have a durometer of between about 55 and about 58 Asker C. Of course, the tongue and tongue stiffener may be configured with other suitable hardnesses.

One example of suitable material forming the tongue stiffener, such as a thermal plastic polyester elastomer, is Hytrel®, which may be purchased from the E. I. du Pont de Nemours and Company, USA. Other suitable plastics, such as thermoplastic polyurethane or nylon, may be used for this or other stiffeners. Also, non-plastic materials may be used. The stiffener may also be formed of two or more materials, each material having a different stiffness. Each material may be formed at a discrete location on the stiffener body, thereby causing the stiffener body to have a varied stiffness.

As mentioned, the flexibility or rigidity of the stiffener 24 also may be adjusted by providing the stiffeners with different shapes. For example, controlling the dimensions of the hour-glass shape may aid in providing the stiffener with a desired stiffness. In addition, one or both sides 39a, 39b may include a plurality of flex inducing members such as grooves or notches 98 having a bottom and a sidewall. The grooves 98 may be sized and shaped to provide a desired rigidity or stiffness at least to a portion of the stiffener, such as the mid-section. In this respect, due in part to the presence of the grooves, the mid-section is able to flex to a greater extent than other portions of the stiffener. The grooves 98 may also act to minimize kinking of the mid-section of the stiffener as the tongue and stiffener are flexed. In this respect, the grooves 98 provide controlled flexing of the stiffener.

In addition, at least one aperture 100 may be formed completely through the stiffener 24, with the aperture 100 being shaped and dimensioned in accordance with the desired flexibility or rigidity. Like the grooves 98, the apertures 100 may also act to minimize kinking of the stiffener as the tongue and stiffener are flexed. The flexibility or rigidity of a single stiffener 24 may be further adjusted by providing a stiffness adjuster 102, which may fit into the aperture 100, or any other suitable aperture formed in the stiffener. Of course, the stiffness adjuster 102 need not be placed into an aperture of the stiffener, but rather may be attached to one or more locations on the surface or periphery of the stiffener body. A variety of inserts may be supplied, each rendering the stiffener 24 with a different degree of stiffness. The stiffness adjuster may be formed of an elastomer or any other suitable material. Accordingly, a wearer may adjust the flexibility by selecting a desired type or number of stiffness adjusters 102.

The various embodiments of the tongue stiffener described may be used with any suitable footwear cooperating with a tongue. In one example, as shown in Figure 1, a soft or hybrid snowboard boot 20 the tongue 22 is attached to the boot upper 26, which extends from a flexible sole 28, near a toe area of the boot upper 26. The tongue may be a molded tongue or a stitched tongue. A fabric may be stretched over the tongue. The tongue may be joined to the upper by stitching, bonding or other suitable joining arrangements as would be apparent to one of skill in the art. The upper is formed of a suitable material, such as leather. To provide traction on snow covered terrain, the sole 28 may be formed with treads. The sole 28 may also include a foam inner sole or midsole to dampen shock transmission to the rider's

feet induced during various maneuvers, such as landing jumps. An inner bladder or boot liner, whether permanent or removable, may also be provided for a snug fit and insulation from cold temperatures, snow and water. The boot may be constructed with any suitable closure device, such as buckles, laces, rotary closure systems and the like. Although the tongue 22 is shown attached to the boot upper 26, it should be appreciated that the present invention is not limited in this respect. Instead, the upper 26 may be formed without a tongue, and the tongue may be part of the inner bladder. In addition, the tongue 22 may be a free-floating tongue.

For ease of understanding, and without limiting the scope of the invention, the tongue stiffener for footwear to which this patent is addressed is discussed below particularly in connection with a snowboard boot. However, it should be appreciated that the present invention is not limited in this respect, and that the aspects of the present invention described below can be used in association with other types of footwear.

Having thus described certain embodiments of the present invention, various alterations, modification and improvements will readily occur to those skilled in the art. Such alterations, modifications, and improvements are intended to be within the spirit and scope of the invention. Accordingly, the foregoing description is by way of example only, and not intended to be limiting. The invention is limited only as defined in the following claims and the equivalent thereof.

What is claimed is:

CLAIMS

1. A tongue construction for an article of footwear comprising:
a tongue; and
a tongue stiffener including an elongated body having a first portion engaged to said
5 tongue and a second portion being movable relative to said tongue as said tongue is flexed
forwardly to reduce pressing of said stiffener into said tongue.
2. The tongue construction according to claim 1, wherein said first portion is
removably fixed to said tongue.
3. The tongue construction according to claim 1, wherein said first portion is an
10 upper end of said tongue stiffener.
4. The tongue construction according to claim 1, wherein said second portion is a
lower end of said tongue stiffener.
5. The tongue construction according to claim 1, wherein said tongue defines a
shin-to-toe axis, with said tongue stiffener being movable substantially along at least said
15 shin-to-toe axis.
6. The tongue construction according to claim 1, wherein said tongue stiffener
has a length substantially less than a length of said tongue.
7. The tongue construction according to claim 4, wherein said lower end of said
tongue stiffener is spaced from a lower end of said tongue stiffener.
- 20 8. The tongue construction according to claim 1, wherein said tongue stiffener
further includes a medial side and a lateral side, said tongue stiffener being movable toward
said medial or lateral sides in response to flexing of the article of footwear in a respective
medial or lateral direction.
9. The tongue construction according to claim 1, wherein said tongue includes a
25 recess formed in an outward facing surface thereof, said recess receiving said tongue
stiffener.

10. The tongue construction according to claim 9, wherein said recess includes a lower edge and wherein a length of said recess is formed larger than a length of said tongue stiffener, thereby defining an open area between a lower end of said tongue stiffener and said lower edge of said recess, said open area facilitating relative movement of said tongue stiffener within said recess.

11. The tongue construction according to claim 9, wherein said recess has a depth of about equal to a thickness of said tongue stiffener such that an extent to which the tongue stiffener protrudes beyond said outward facing surface of said tongue is minimized.

12. The tongue construction according to claim 1, wherein said tongue stiffener overlies said tongue and wherein said tongue is constructed and arranged to maintain said second portion of said stiffener adjacent to said tongue while allowing relative movement between said tongue stiffener and said tongue.

13. The tongue construction according to claim 12, wherein said tongue is constructed and arranged to loosely constrain longitudinal, medial and lateral movement of said tongue stiffener.

14. The tongue construction according to claim 12, further comprising a cover attached to at least said lower end of said tongue, said cover maintaining said second portion of said stiffener adjacent to said tongue while allowing relative movement therebetween.

15. The tongue construction according to claim 1, wherein an end of said tongue stiffener includes a tip having a narrowing dimensioned cross-section, said tip thereby facilitating movement of the stiffener relative to the tongue.

16. The tongue construction according to claim 1, further comprising a hook attached to said tongue to hold said first portion to said tongue.

17. The tongue construction according to claim 16, wherein said tongue stiffener includes a slot engaging with said hook.

- 15 -

18. The tongue construction according to claim 16, wherein said tongue includes an opening and wherein said hook includes a base passing through said opening and a hook insert secured to said base.

5 19. The tongue construction according to claim 18, wherein said tongue includes a depression formed in an inward facing surface of said tongue, said depression surrounding said opening, said base being received within said depression such that an extent to which the base protrudes beyond said inward facing surface is minimized.

20. The tongue construction according to claim 19, further comprising a foam covering attached over an inward facing side of said base.

10 21. The tongue construction according to claim 20, wherein said base and said hook insert cooperate with each other to substantially reduce rotation of the hook insert relative to the base.

22. The tongue construction according to claim 18, wherein said hook insert snap fits into engagement with said base.

15 23. The tongue construction according to claim 1, wherein the article of footwear has a closure device to secure the article of footwear to a wearer and wherein said stiffener includes at least one receiving feature constructed and arranged to cooperate with the closure device such that the closure device secures said first portion of said stiffener to said tongue as the closure device closes the article of footwear.

20 24. The tongue construction according to claim 1, wherein the footwear includes a pair of eye stays configured to draw toward each other upon tightening of the footwear to a wearer, the eye stays defining a resulting space therebetween, the stiffener having a width sufficient to lie within said resulting space without interference with the eye stays.

25 25. The tongue construction according to claim 23, wherein said receiving feature centers said tongue and said tongue stiffener relative to the article of footwear upon closing said article of footwear about the wearer.

26. The tongue construction according to claim 23, wherein said receiving feature is an eyelet formed in said tongue stiffener, said eyelet constructed and arranged to receive a lace of the article of footwear.

27. The tongue construction according to claim 1, wherein the stiffness of the tongue stiffener is suitable to provide a substantial resistance to flexing beyond a forward flex angle of about 45°.

28. The tongue construction according to claim 1, wherein said tongue stiffener includes at least one aperture formed therein.

29. The tongue construction according to claim 1, further comprising at least one stiffness adjuster cooperating with said tongue stiffener to selectively change the stiffness of said tongue stiffener.

30. The tongue construction according to claim 28, further comprising a stiffness adjuster placed within said at least one aperture to selectively change the stiffness of said tongue stiffener.

31. The tongue construction according to claim 1, wherein said tongue stiffener overlies said tongue.

32. The tongue construction according to claim 1, wherein the stiffener body includes a flex inducing member formed therein.

33. The tongue construction according to claim 32, wherein said stiffener body is formed in an hour-glass shape defining a waist area.

34. The tongue construction according to claim 33, wherein said stiffener body includes sidewalls and wherein said flex inducing member comprises a plurality of flex inducing members formed along said sidewalls in said waist area.

35. The tongue construction according to claim 1, in combination with the article of footwear.

36. The combination of claim 35, further comprising a plurality of interchangeable stiffeners, each stiffener being removably attached to said tongue at said first portion of said stiffener, each stiffener having a different flexibility.

37. The combination of claim 36, wherein said article of footwear is one of a soft
5 and hybrid snowboard boot.

3/5

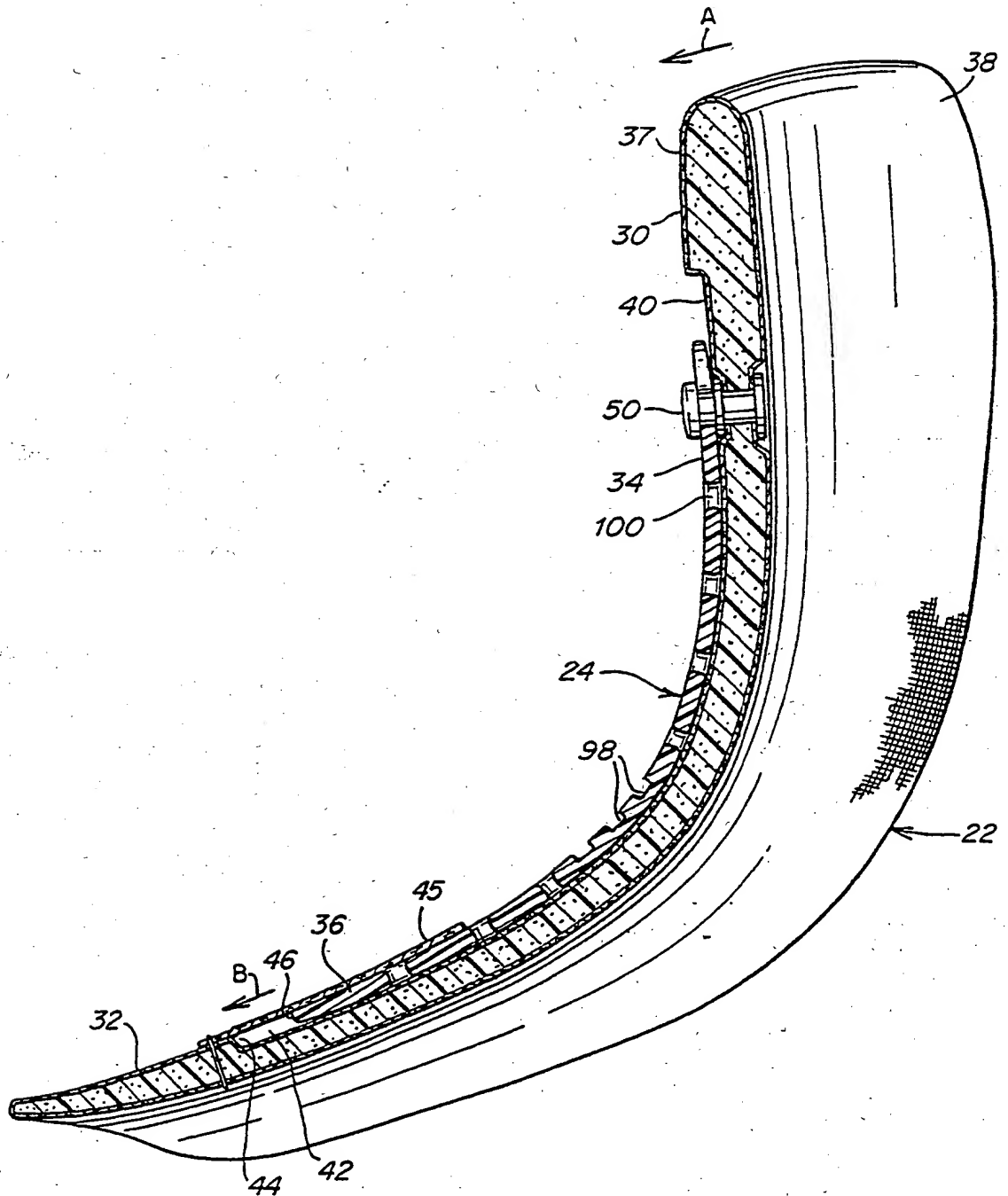


Fig. 3

4/5

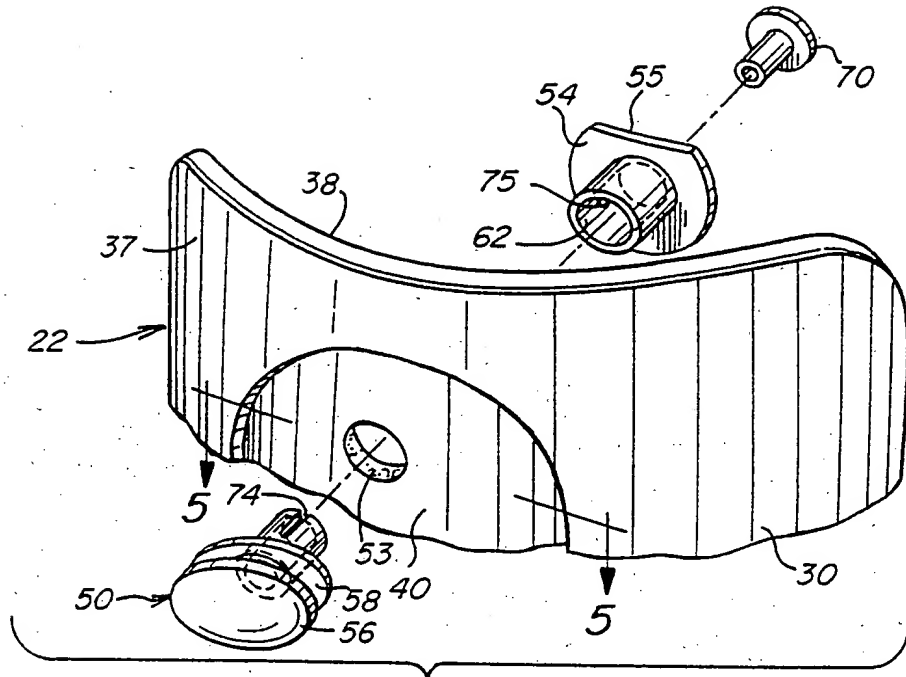


Fig. 4

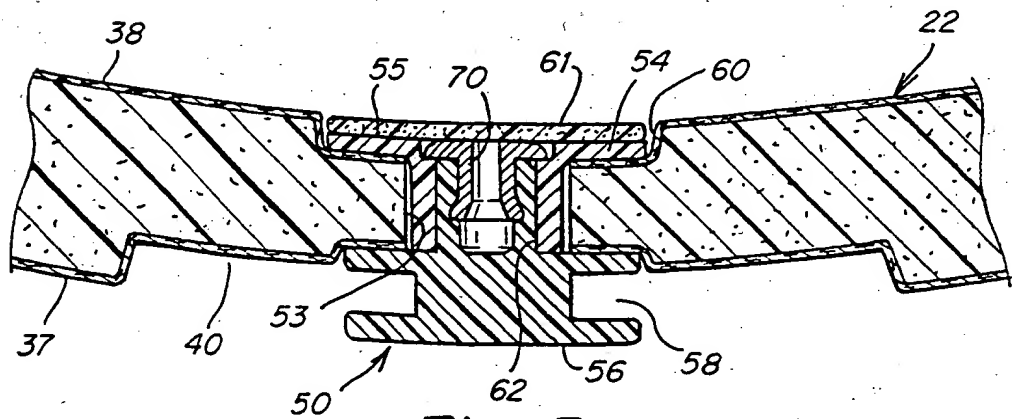


Fig. 5

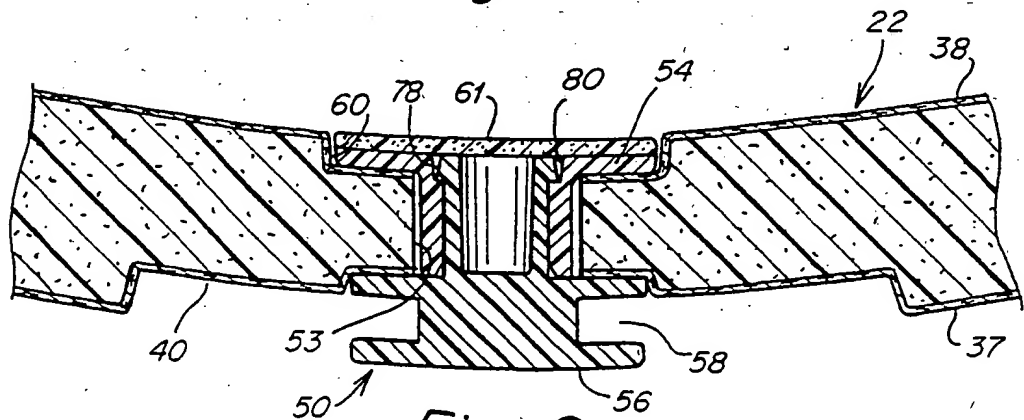


Fig. 6

5/5

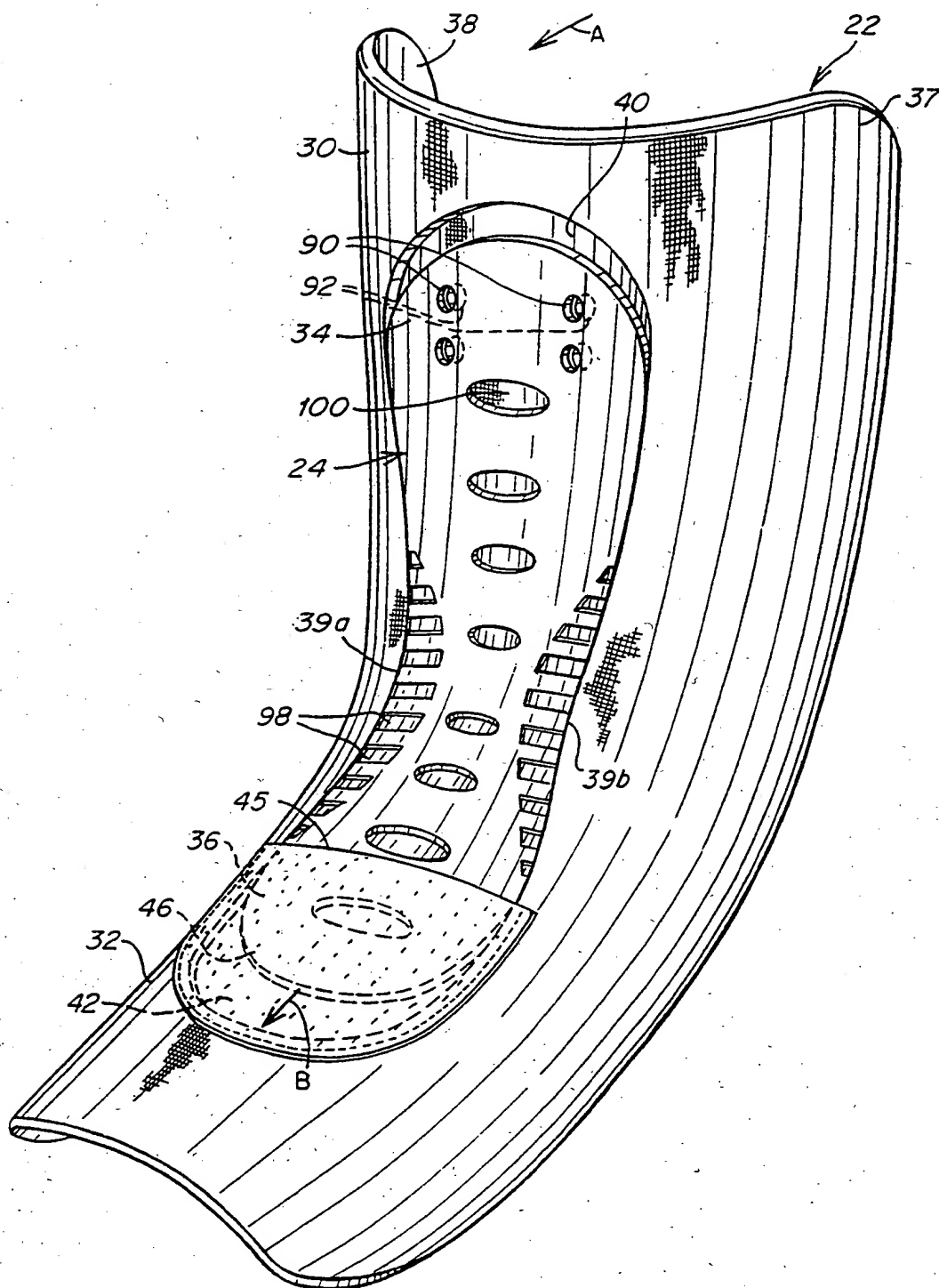


Fig. 7

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 99/29141

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A43B5/04 A43B23/26

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A43B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 672 364 A (DYNAFIT SKISCHUH GMBH) 20 September 1995 (1995-09-20)	1-7, 9, 12, 13, 15, 16, 18, 27-31, 35 37
A	page 5, line 16 -page 6, line 3; figures ---	
X	GB 213 181 A (KINGS PATENT AGENCY LTD) 17 April 1924 (1924-04-17)	1, 2, 5-7, 9, 12, 13, 31, 35 33
A	the whole document ---	
X	EP 0 647 414 A (NORDICA SPA) 12 April 1995 (1995-04-12)	1-8, 12-14, 16-22, 27, 28, 31-33, 35 37
A	column 3, line 32 - line 42; figure 6 ---	
	-/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

13 April 2000

Date of mailing of the international search report

28/04/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Scholverinck, T

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 99/29141

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 470 206 A (ANNOVI GIUSEPPE) 11 September 1984 (1984-09-11)	1,2,5,8, 12,13, 27-29, 31,35,36
A	column 1, line 58 -column 2, line 22; figures	3,4,30, 32,37
A	EP 0 695 515 A (TECNICA SPA) 7 February 1996 (1996-02-07) column 3, line 45 -column 4, line 2; figure 7	1-37
A	US 1 489 000 A (MITCHELL) 1 April 1924 (1924-04-01) column 1, line 23 -column 29; figures	1,23-26
A	US 4 928 405 A (SPADEMAN RICHARD G) 29 May 1990 (1990-05-29) column 5, line 35 - line 39; figures 6,7	1,23,25

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 99/29141

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0672364 A	20-09-1995	AT 403112 B AT 54894 A	25-11-1997 15-04-1997
GB 213181 A		NONE	
EP 0647414 A	12-04-1995	IT 1266126 B JP 7155202 A	20-12-1996 20-06-1995
US 4470206 A	11-09-1984	DE 3247206 A JP 1661096 C JP 3027201 B JP 58127601 A	21-07-1983 19-05-1992 15-04-1991 29-07-1983
EP 0695515 A	07-02-1996	IT TV940048 U JP 8056702 A US 5647146 A	05-02-1996 05-03-1996 15-07-1997
US 1489000 A	01-04-1924	NONE	
US 4928405 A	29-05-1990	US 4494324 A US 4382342 A AT 380384 B AT 906280 A CA 1138639 A CH 651452 A DE 3049653 C JP 56500762 T WO 8002789 A US 5426871 A US 4338735 A US 5640787 A AT 374352 B AT 196579 A CA 1102112 A CH 641938 A DE 2940996 C FR 2419690 A JP 3021161 B JP 55500158 T SE 7909388 A WO 7900770 A US 4360979 A	22-01-1985 10-05-1983 12-05-1986 15-10-1985 04-01-1983 30-09-1985 28-12-1989 11-06-1981 24-12-1980 27-06-1995 13-07-1982 24-06-1997 10-04-1984 15-09-1983 02-06-1981 30-03-1984 29-11-1990 12-10-1979 22-03-1991 21-03-1980 14-11-1979 04-10-1979 30-11-1982

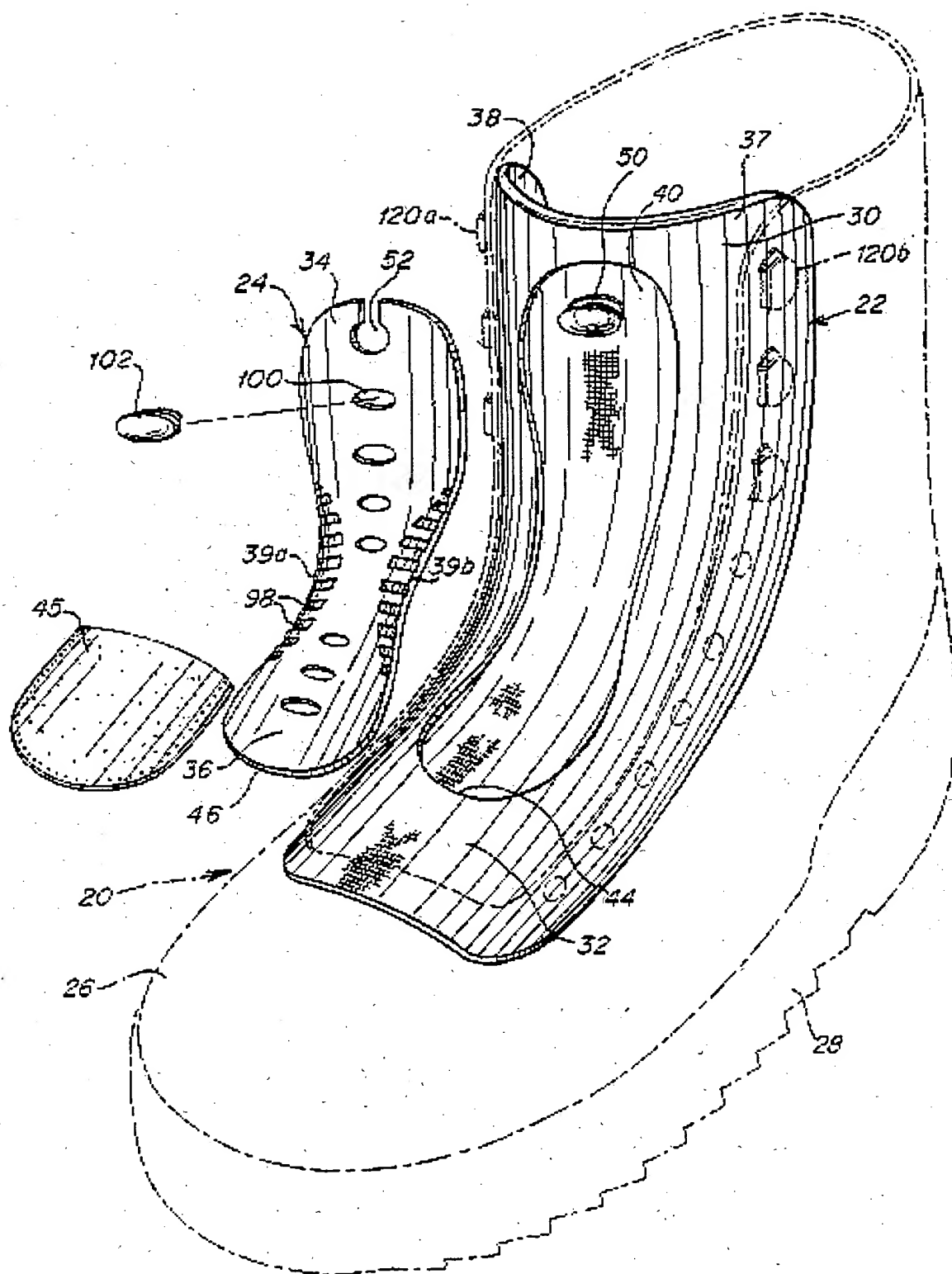


Fig. 1

2/5

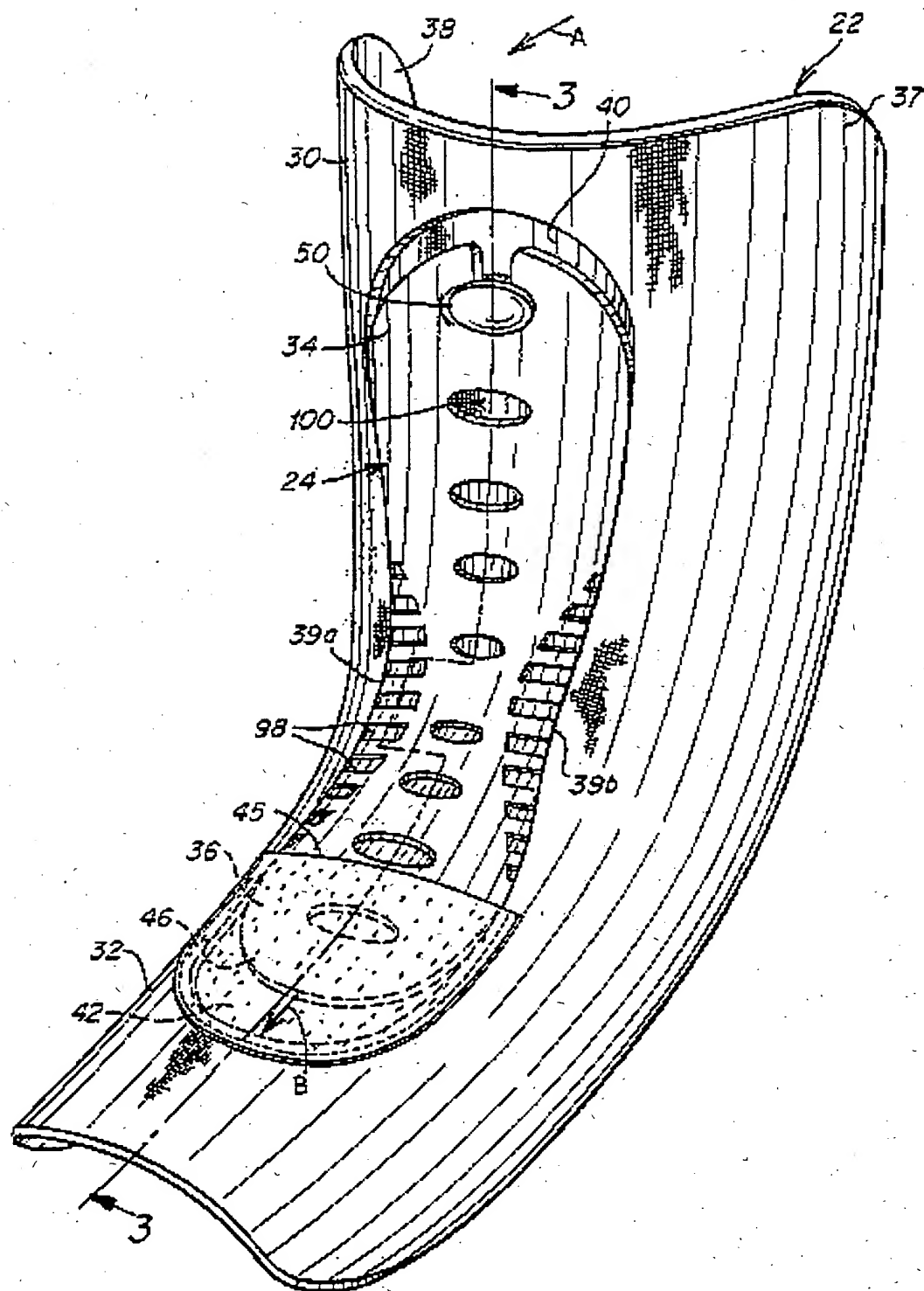


Fig. 2

RECTIFIED SHEET (RULE 91)
ISA/EP

3/5

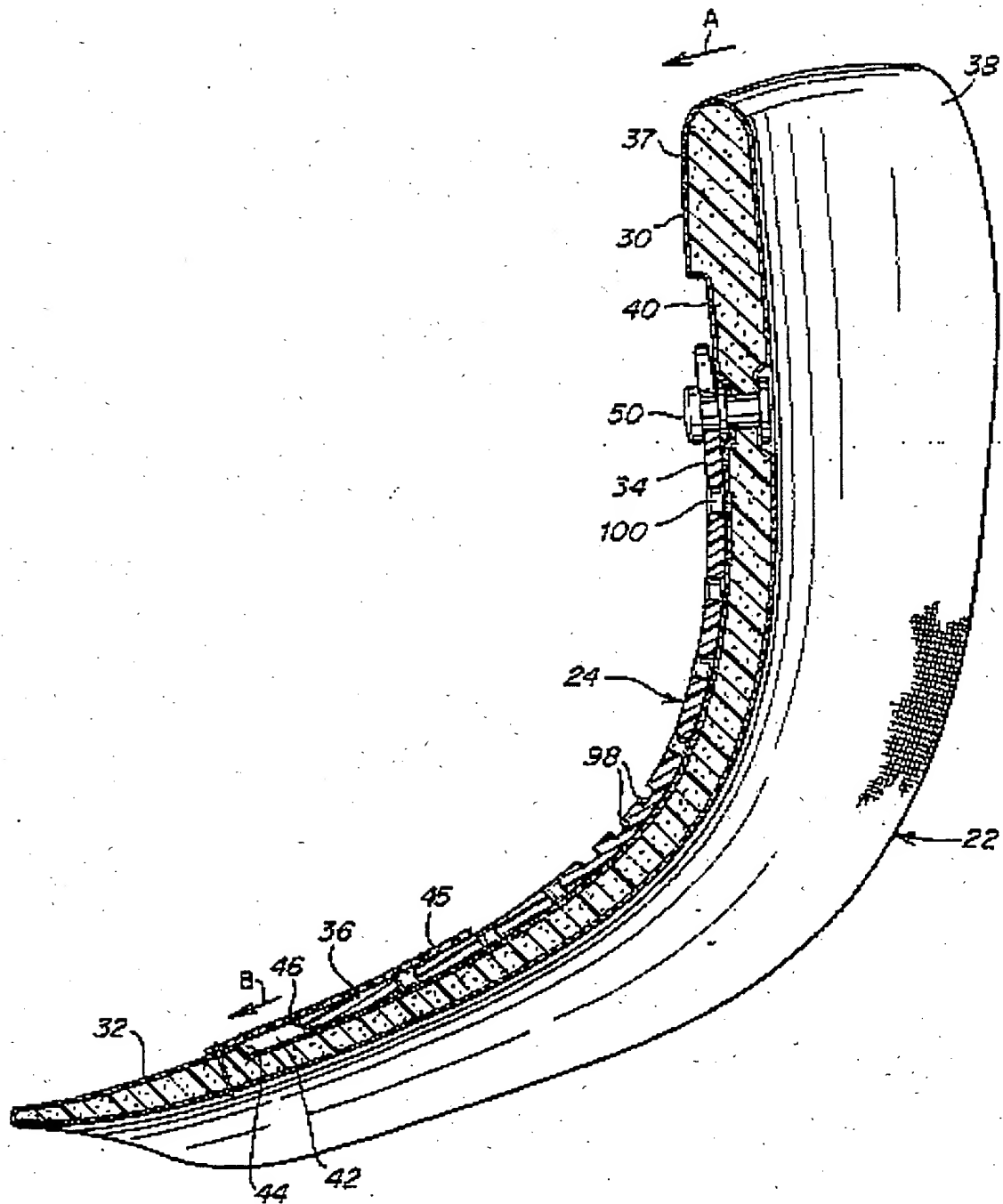


Fig. 3

4/5

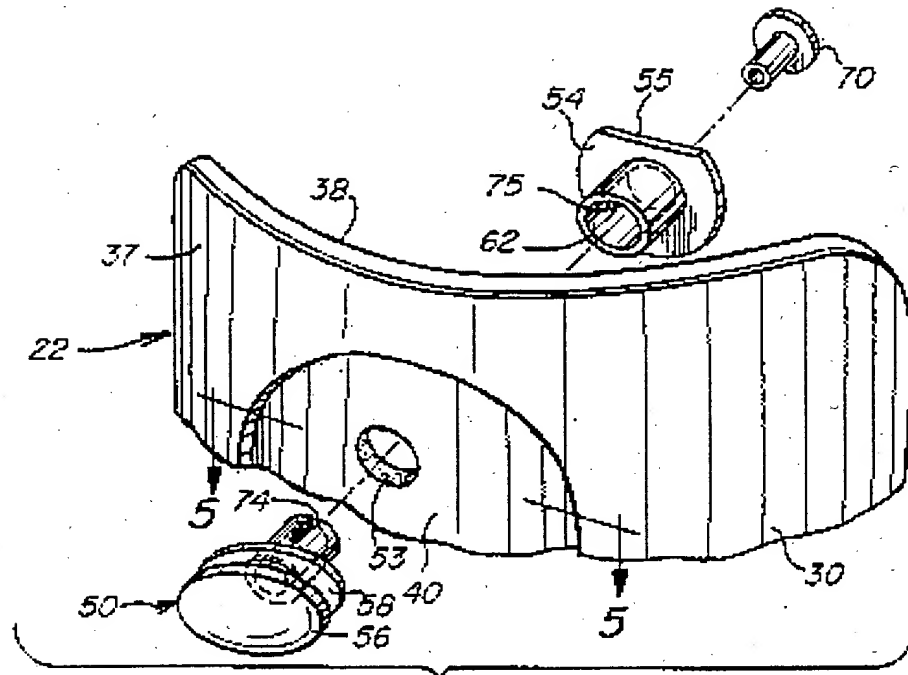


Fig. 4

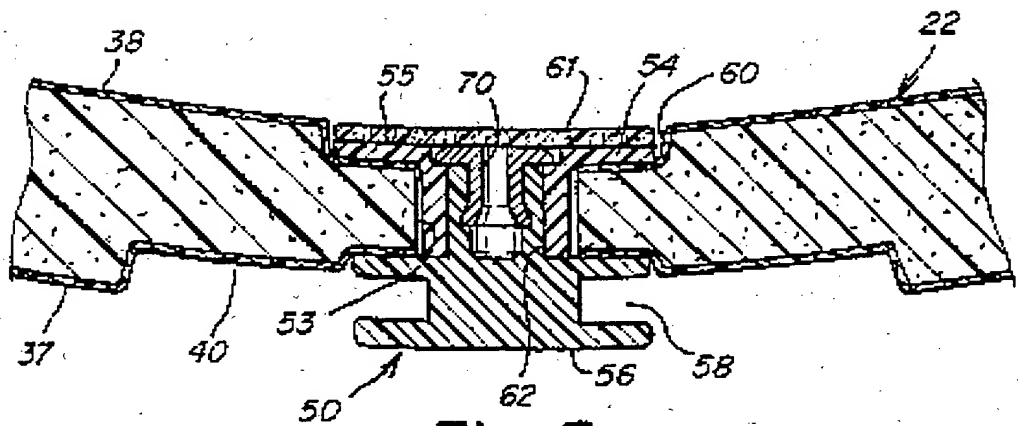


Fig. 5

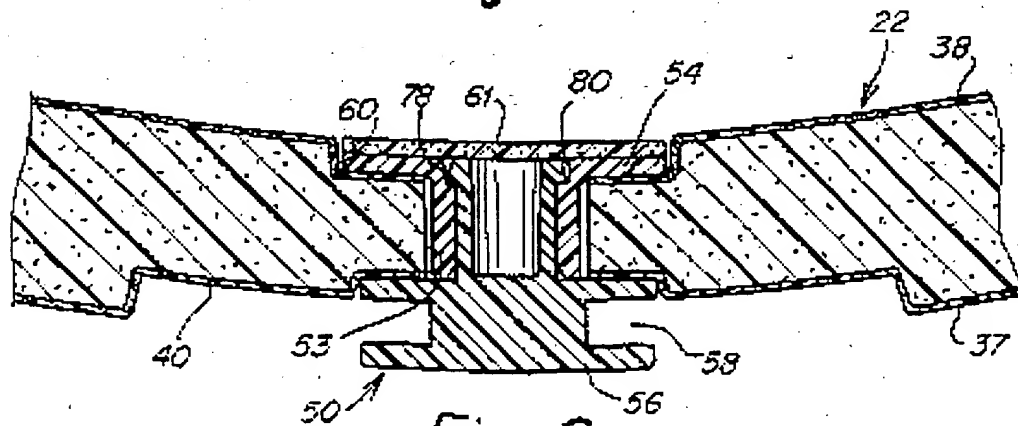


Fig. 6

5/5

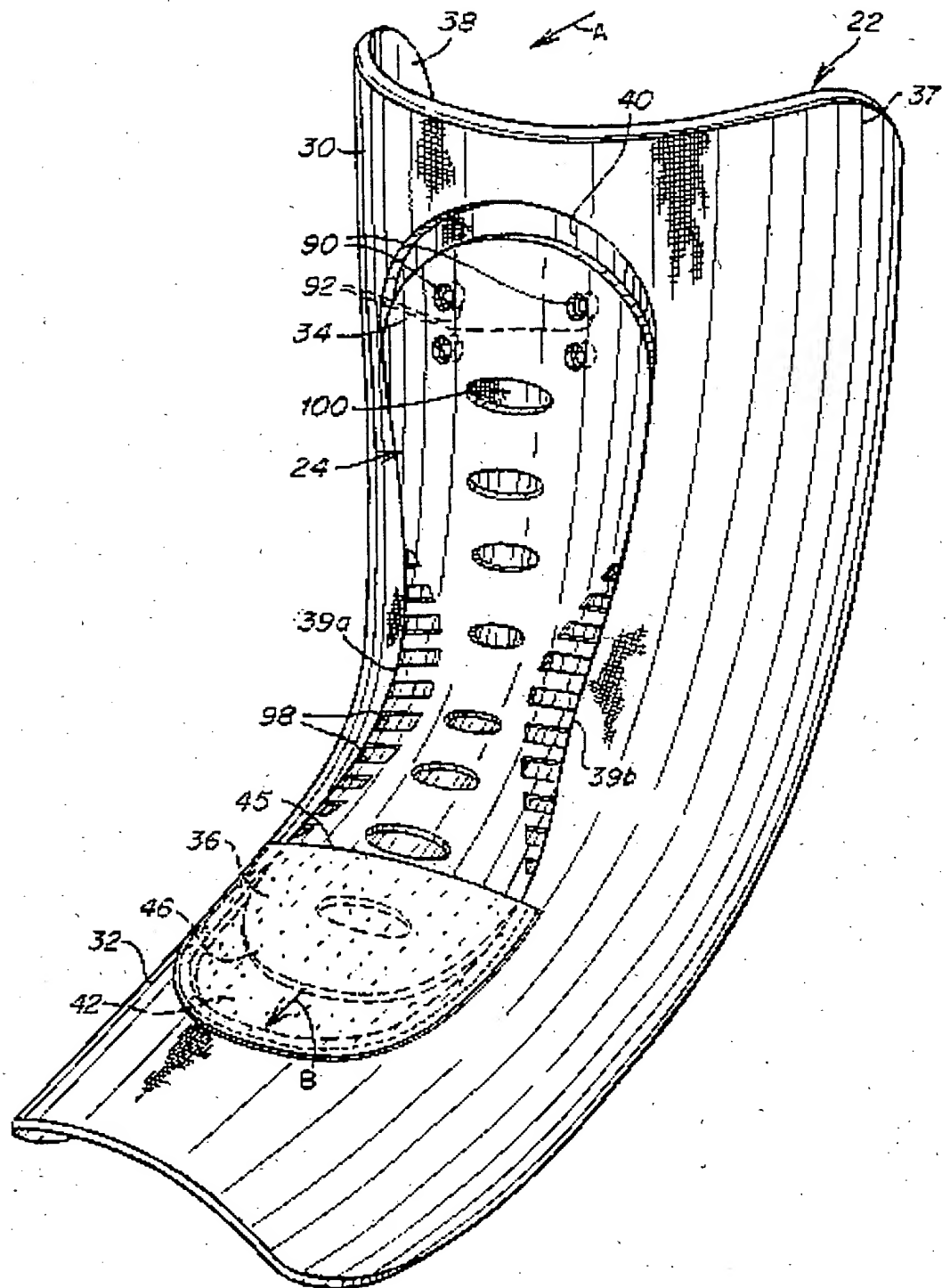


Fig. 7